Integration Beijing Release Testing and S3P Measurement

Helen Chen, PTL of Integration Project

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Agenda

- Integration Beijing Release Main Tasks
- New Features Testing
- S3P Measurement

Integration Beijing Release Main Tasks

- Test
  - E2E Use Case Functionality Testing, retest 4 Use case with the four new functionalities
    1. Change Management
    2. Manual auto-scaling
    3. HPA
    4. PNF
  - ONAP Maturity Testing
    1. Benchmark / KPI definition
    2. Tools
    3. Maturity Testing: focusing on end to end testing
    4. Reporting
  - Automating vFW / vLB, vCPE, and some level of automation for VoLTE

- Release
  - Creating ONAP "Light" for SE/Architect to try out its functionality, not coding
  - Maintain and setup daily health check, automated use cases (vFW/vLB, vCPE) (/w Jenkins)
  - Deployment:
    - OOM / K8S: simplifying and stablizing K8S deployment
    - Heat Template: optimizing

- Reference VNFs: creating "light" VNFs for scalability testing
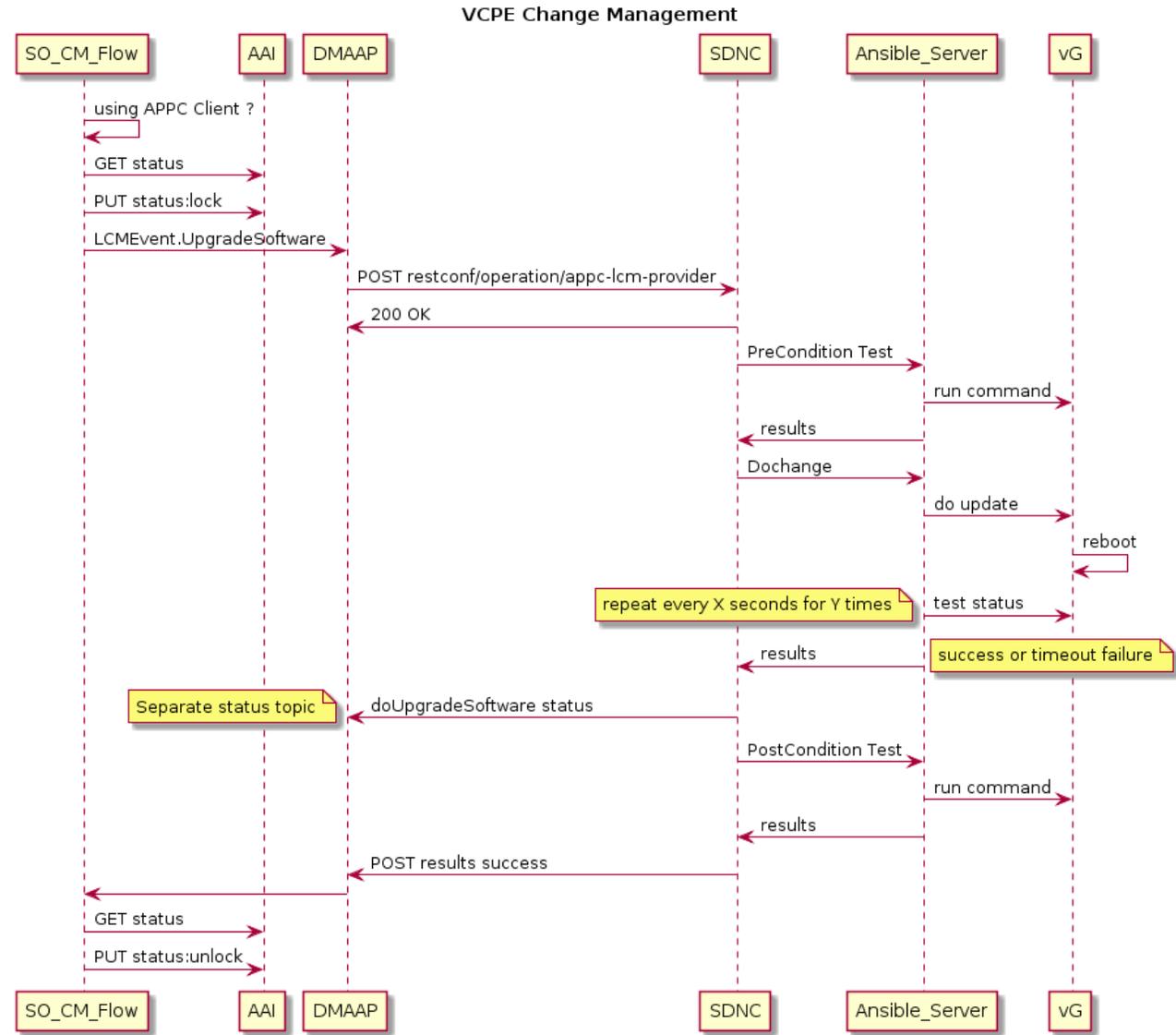
- Upgrade Strategy Definition: from B to C

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Test Case for Change Management

@vCPE

- Change management (CM) will be a generic function that works for all VNFs.
- We will test CM in R2 using the vG VNF in vCPE.

VCPE Change Management

Test Case for Hardware Platform Awareness (HPA)

@vCPE

- ## Discovery
  - After HPA info is discovered and recorded in AAI. Check AAI to validate such data.

- ## Design Time
  - After service design completes in SDC, examine the TOSCA template to validate HPA-related descriptions.

- ## Instantiation
  - The high level flow to instantiate vCPE remains the same.
  - The major difference happens during VNF instantiation where OF/Policy/AAI provide placement info based on HPA requirements and MultiCloud performs instantiation accordingly, as illustrated.


VNFC Instantiation Flow Diagram
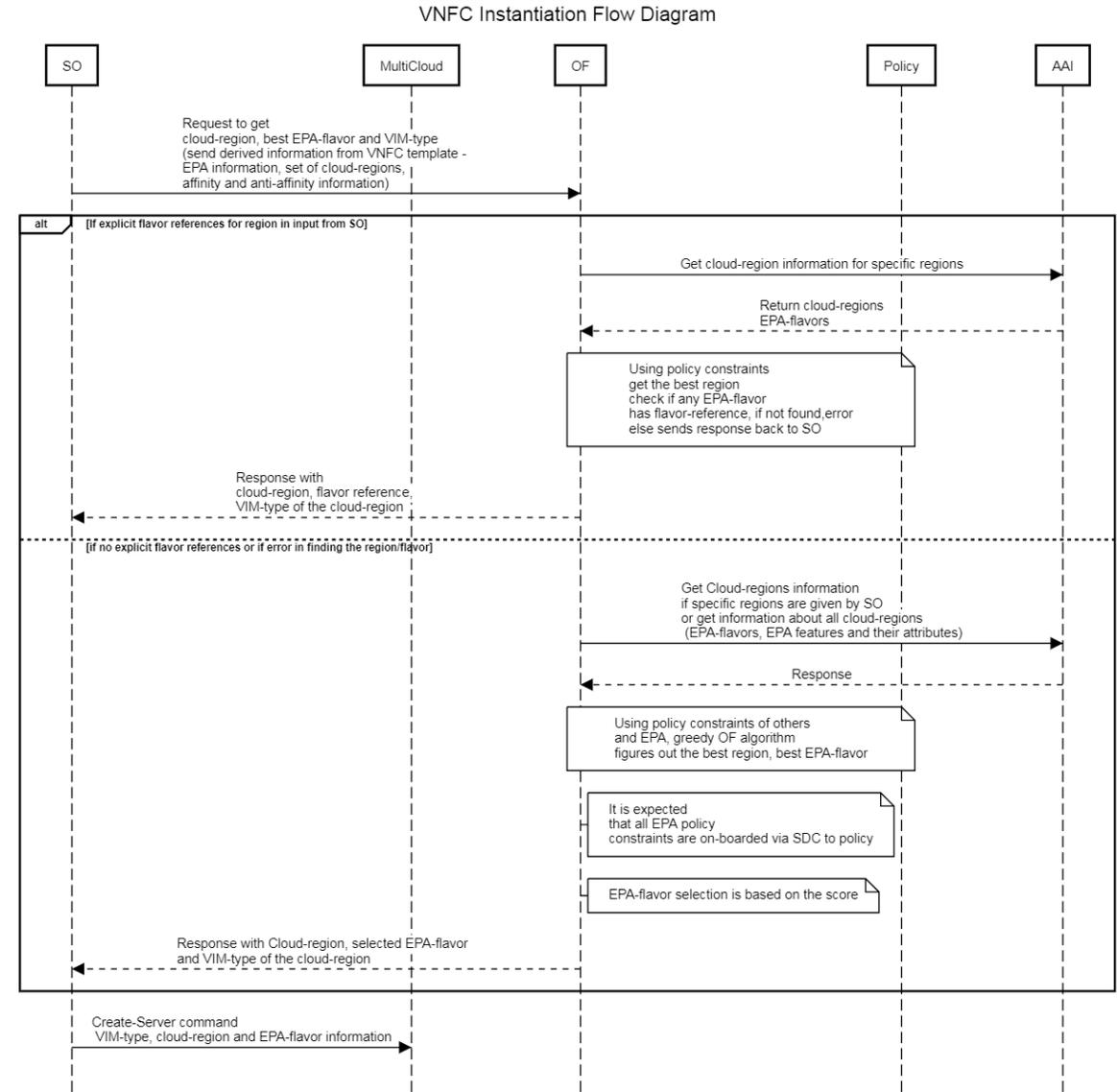
Manual Scaling Functionality Testing

@VoLTE

Manual Scaling Feature Testing:

- Onboard a VNFD with scaling support in SDC

- Design VoLTE e2e service with the scalable VNF

- After VoLTE service instantiation, use UUI portal to manually scale up the VNF

- Verify VNF is scaled up from VIM and A&AI

- Use UUI portal to manually scale down VNF

- Verify VNF is scaled down from VIM and A&AI

- Cancel VoLTE service and verify VNF is removed from VIM
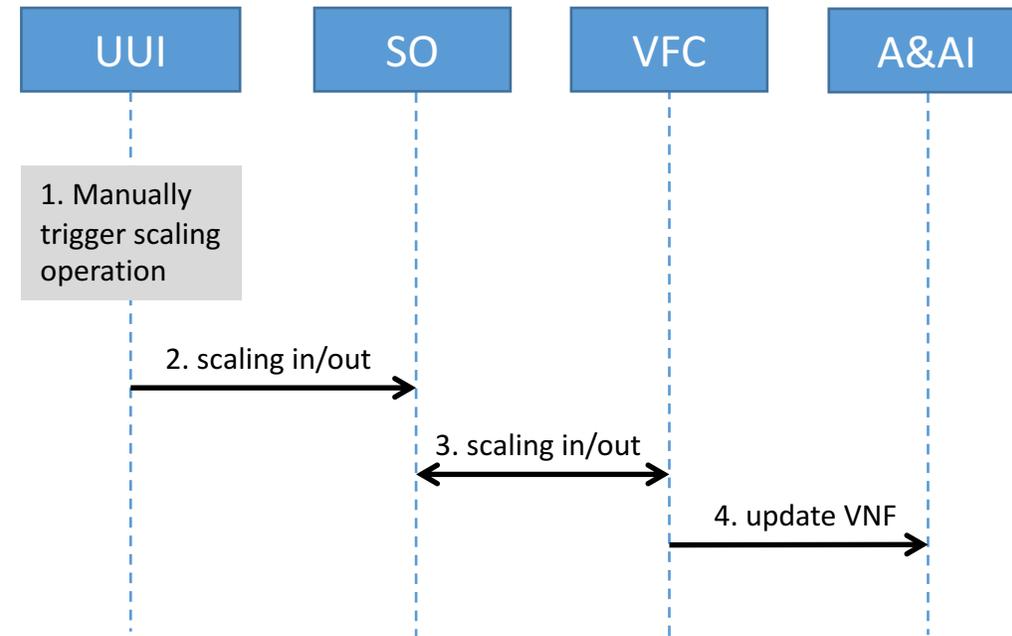
VoLTE Manual Scaling Workflow

PNF Functionality Testing

@VoLTE (stretch)

PNF Features Testing:

- Onboard PNFs in SDC
- Design e2e service with PNFs in SDC
- Instantiate service in UUI
- Verify connection between PNFs is created in network
- Verify service and connection data in A&AI is updated correctly
- Cancel service in UUI
- Verify connection between PNFs is deleted in network
- Verify service and connection data is removed in A&AI
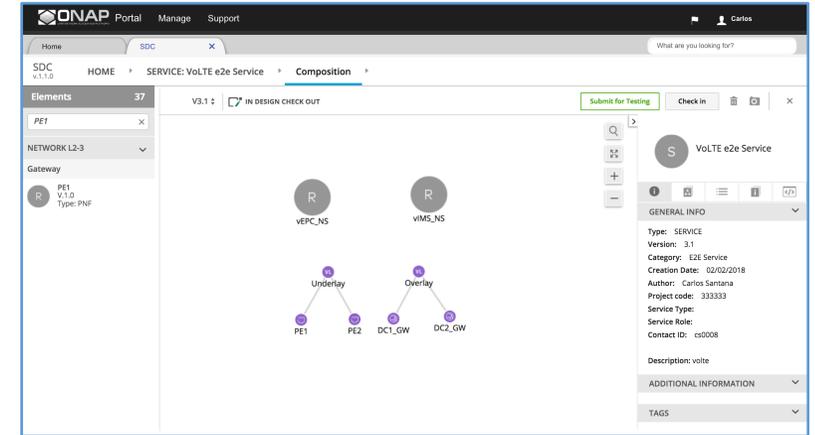

Service Design with PNFs

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ONAP Maturity Testing (Proposals)

- Test Infrastructure

- Reporting

- Metrics / KPI:
  - Security
  - Resiliency
  - Stability
  - Performance
  - Scalability
  - No quantized data for manageability and usability

ONAP
OPEN NETWORK AUTOMATION PLATFORM

ONAP Maturity Testing Infrastructure

- We have two labs ready for ONAP community to use for end to end integration testing and pairing testing
    - Intel / Windriver Lab
    - TLAB
- Tools (under investigating)
    - Performance / Scalability: JMeter / Locust
    - Profiling: JProfile (for Java code only)
    - Resilience: Chaos Monkey
    - Security: Sonarqube, Bandit, Nexus Auditor, Nmap, Burp suite
    - Stability: we plan to write some python scripts
- Simulators for controller and VNFM

Test Setup

Service Load Simulator

ONAP

Simulator
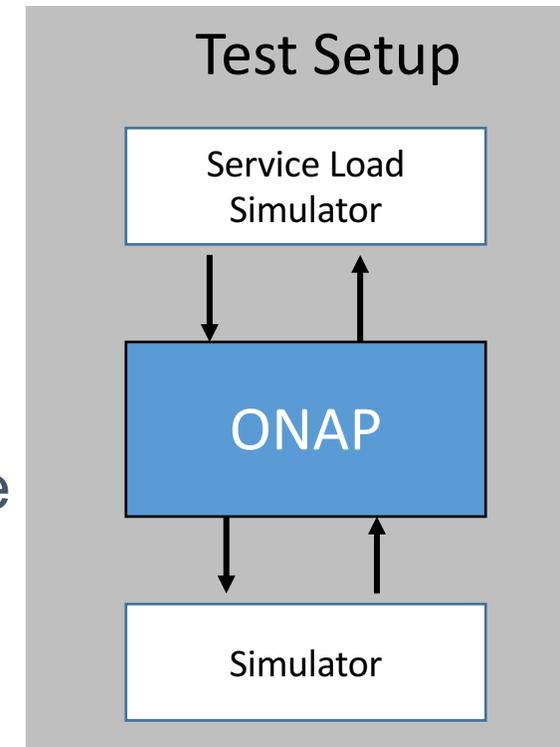
Reporting: A Centralized Page For Monitoring ONAP Maturity Status

Proposal:

- Automatically generated content:
    1. Daily health test results deployed by OOM
    2. Daily health test results deployed by Heat
    3. Daily functionally test results for: vFW / vLB / vCPE / VoLTE
    4. ONAP Maturity test report

- Responsible: Integration Team / Documentation Team

- TODO: follow up with LF with appropriate deployment solution

ONAP Integration Maturity Testing: Overall Principal

- Defining the benchmarks
- Focusing on Measurement
- Through end to end use cases (recommend project leverage its CSIT)
  - Service design
  - Service instantiation
  - Closed loop

ONAP Maturity Testing Metrics: Security

Area	Priority	Min. Level	Stretch Goal	Level Descriptions (Abbreviated)
Security	High	**Level 1** - 70% of projects; non-passing meet 80% of requirements Cryptographic – all projects	**Level 2**	• 1 – CII Passing badge + 50% test coverage • 2 – CII Silver badge; internal communication encrypted; role- based access control and authorization for all calls • 3 – CII Gold

- Tools:
    - Sonarqube, Bandit, Nexus Auditor, Nmap, Burp suite
    - Simulators: controller, VNFM, PNF

- Metrics
    - CII will be tested with the system provided by LF
    - Other testing:

Web Security	1.Each request needs to validate the Session ID of the user and verify whether the user is authorized to perform this operation. E.g. CLI login 2.Web access to prevent SQL,XSS and command injection risks.
Network Access Security	1. ALL ONAP reserved network ports used by the service or API in the system need to be documented. 2. Unused access, such as unused commands, unused ports, and etc. must be deleted. 3. All open ports on ONAP is necessary by the system maintenance, and transmission channel must be encrypted. 4. ALL the files access must be authenticated.
Sensitive Data Encryption	1. The key data should be encrypted at both storage and information exchange process, such as password, token. 2. Weak password detection, regular password changes, multiple failed login lock to prevent brute force attacks. The user password changes need to verify the original password.
Log Audit	In ONAP system need log audit, including login logs, operation logs, and system logs.
The third-party vulnerabilities	Check ONAP major vulnerabilities of third-party component version, and modify it
Integrity protection	For those key files and programs in ONAP system, we need to have the corresponding protection mechanism to prevent they are tampered

ONAP Maturity Testing Metrics: Resiliency

Area	Priority	Min. Level	Stretch Goal	Level Descriptions (Abbreviated)
Resiliency	High	**Level 2** – run-time projects **Level 1** – remaining projects	**Level 3** – run-time projects **Level 2** – remaining projects	•1 – manual failure and recovery (< 30 minutes) •2 – automated detection and recovery (single site) •3 – automated detection and recovery (geo redundancy)

- Tools:
  - Chaos Monkey
  - Simulators: controller, VNFM, PNF

- Metrics
  - Basic:
    - Each failure and restoration should be reported and displayed in a timely manner.
      - Time of detecting the failure :
        - Time to detect error in workflow execution
        - Time to detect VNF crash
        - Time to detect ONAP component failure
        - Time to detect external components failure (eg VIM, external SDNC…)
      - Mean Time To Repair after full crash
      - Mean Down Time
    - In memory data should be kept, (Yes / No)
    - File system/db data should be kept, (Yes / No)
  - Use case instantiation metrics:
    - After a failure is detected and restored, a use case can be successfully instantiated. (Yes / No)
    - Key projects: SO, SDNC, APPC / VFC, MultiCloud, AAI, etc.
  - Use case operation metrics
    - After a failure is detected and restored, the following operations can continue
      - Monitoring, (Yes / No)
      - Auto healing. (Yes / No)
      - Scaling. (Yes / No)
    - Key projects: DCAE, DMaaP, Policy, SO, APPC, SDNC, etc.

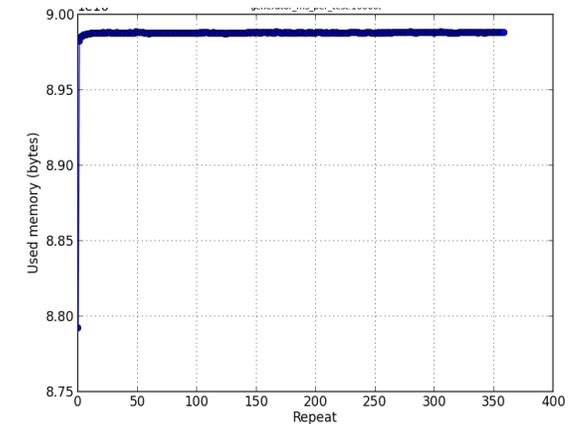# ONAP Maturity Testing Metrics: Stability

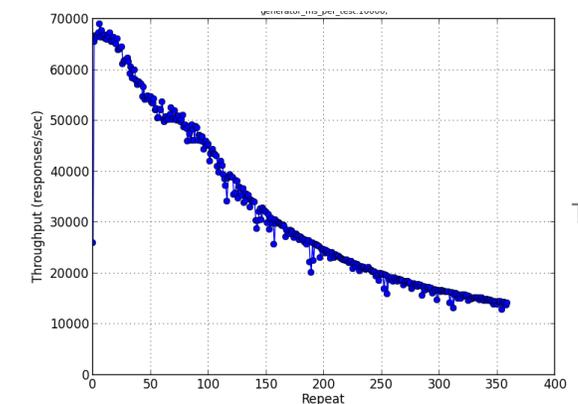| Area	Priority	Min. Level	Stretch Goal	Level Descriptions (Abbreviated)
Stability	Medium	**Level 1**	**Level 2** – run-time projects	•0 -- none •1 – 72 hour component level soak w/random transactions •2 – 72 hour platform level soak w/random transactions •3 – 6 month track record of reduced defect rate

- Tools:
  - JProfile and Scripts
  - Simulators: controller, VNFM, PNF

- Metrics
  - Soak test of ONAP with random requests for 72 hours
    - Service instantiation: (Pass / Fail)
    - Closed Loop
      - Monitoring, (Pass / Fail)
      - Auto healing. (Pass / Fail)
      - Scaling. (Pass / Fail)
  - Run throughput and memory trends against time for critical components (Java first)

Memory

Throughput

ONAP Maturity Testing Metrics: Performance

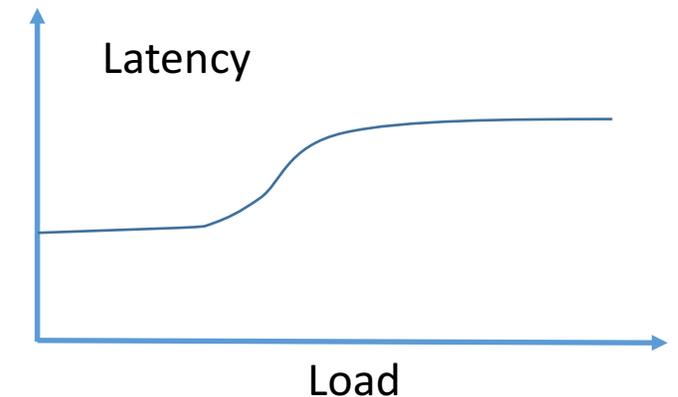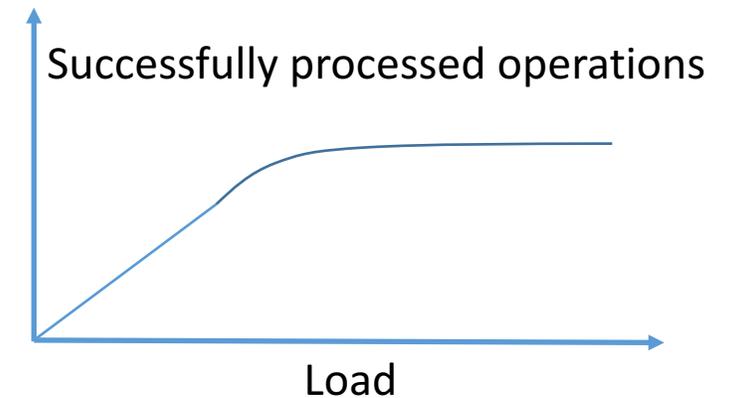| Area	Priority	Min. Level	Stretch Goal	Level Descriptions (Abbreviated)
Performance	Low/Med	**Level 1** – closed-loop projects **Level 0** – remaining projects	**Level 1** – remaining	•0 -- none •1 -- baseline performance criteria identified and measured •2 & 3 – performance improvement plans created & implemented

- Tools:
    - JMeter / Locust
    - Simulators: controller, VNFM, PNFs
- Metrics
    - Number of concurrent users
    - Number of concurrent workflows
    - Throughput & Latency in a range of load
    - Closed-Loop
        - Speed of auto-healing
        - Speed of auto-scaling
        - Related projects: DMaaP, DCAE, Policy, A&AI, APPC/VFC, MultiCloud, etc.

Successfully processed operations / Load

Latency / Load

ONAP Maturity Testing Metrics: Scalability

Area	Priority	Min. Level	Stretch Goal	Level Descriptions (Abbreviated)
Scalability	Low	**Level 1** – run-time projects **Level 0** – remaining projects	**Level 1**	• 0 – no ability to scale • 1 – single site horizontal scaling • 2 – geographic scaling • 3 – scaling across multiple ONAP instances

- Tools:
  - Load: JMeter / Locust
  - Light "VNF"
  - Simulators: controller, VNFM, PNF
- Metrics
  - Size of users
  - Size of infrastructure:
    - Number of managed objects: VNFs
    - Number of managed controllers / VNFMs
  - Size of operations
    - Number of service instantiation per unit of time
    - Number of control loop time
  - Horizontal scaling
  - Geographic scaling (lower priority, only for volunteer projects cross two labs)

Thank you